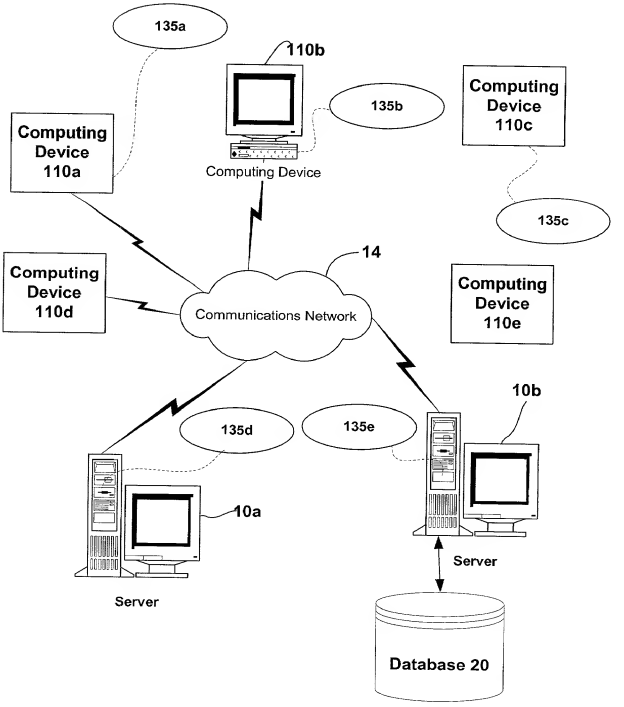

135a
110b
135b
Computing Device 110c
Computing Device 110a
Computing Device
135c
14
Computing Device 110d
Communications Network
Computing Device 110e
10b
135d
135e
10a
Server
Server
Database 20

Figure 1

T00T80"h0082660

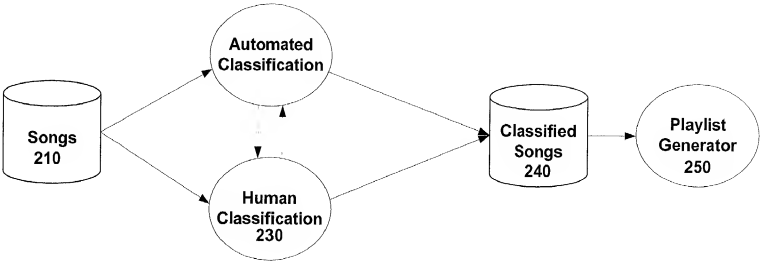


Figure 2

T00T80"h0082660

Sheet 3 of 9
Applicant: Christopher Weare
Title: SYSTEM AND METHODS FOR AUDIO FINGERPRINTING
Filed: August 10, 2001 Docket No.: MSFT-0587 (167514.2)
Attorney: George J. Awad (215) 568-3100

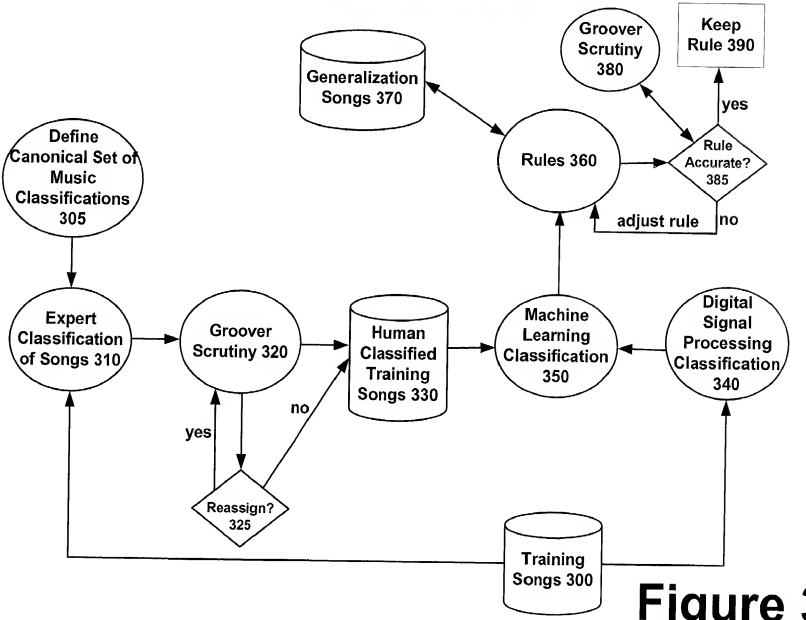
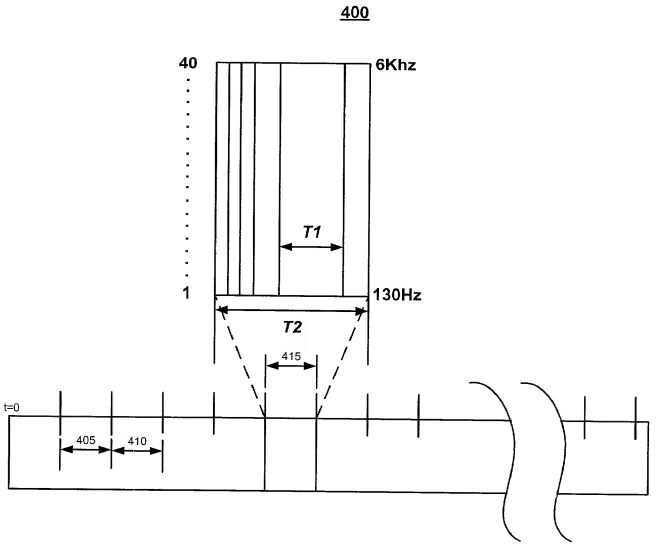


Figure 3



10010 "4000360

Figure 4

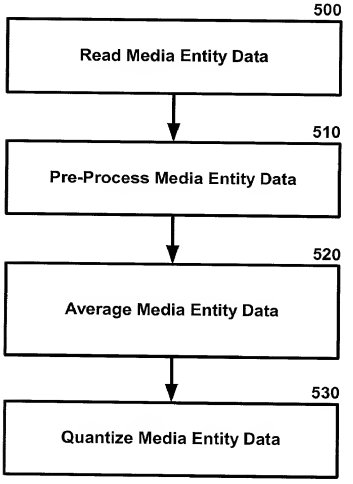

500
Read Media Entity Data
510
Pre-Process Media Entity Data
520
Average Media Entity Data
530
Quantize Media Entity Data

Figure 5

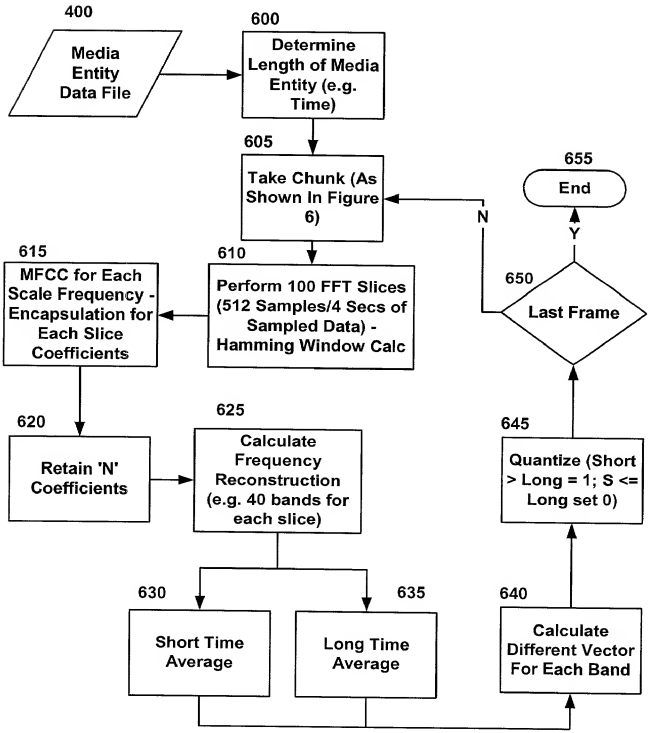

400
Media Entity Data File
600
Determine Length of Media Entity (e.g. Time)
605
Take Chunk (As Shown In Figure 6)
655
End
N
Y
615
MFCC for Each Scale Frequency - Encapsulation for Each Slice Coefficients
610
Perform 100 FFT Slices (512 Samples/4 Secs of Sampled Data) - Hamming Window Calc
650
Last Frame
620
Retain 'N' Coefficients
625
Calculate Frequency Reconstruction (e.g. 40 bands for each slice)
645
Quantize (Short > Long = 1; S <= Long set 0)
630
Short Time Average
635
Long Time Average
640
Calculate Different Vector For Each Band

Figure 6

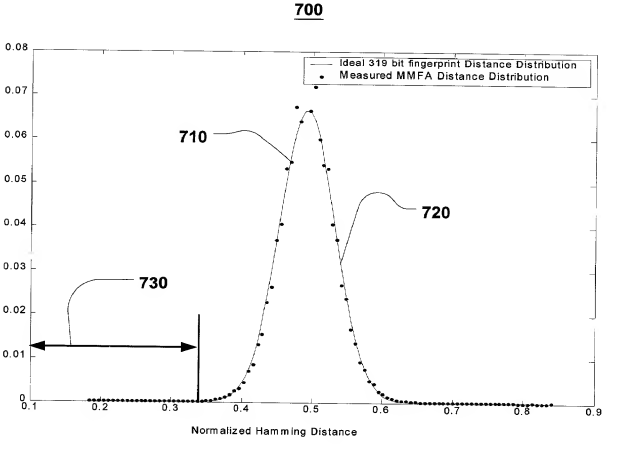
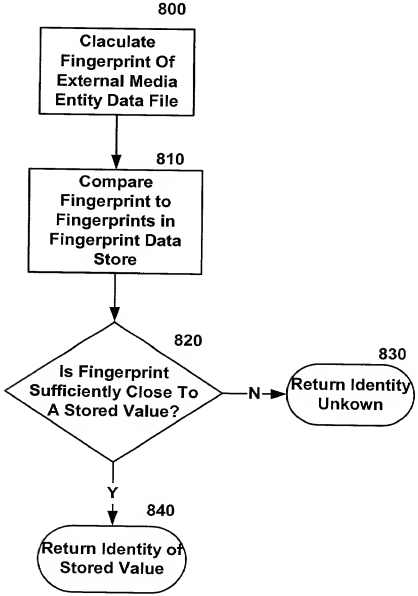

700
Ideal 319 bit fingerprint Distance Distribution
Measured MMFA Distance Distribution
710
720
730
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Normalized Hamming Distance

Figure 7



09928004 "0010104

Figure 8

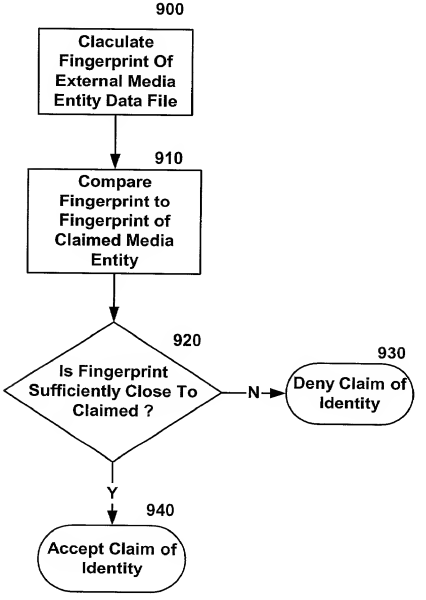

900
Claculate Fingerprint Of External Media Entity Data File
910
Compare Fingerprint to Fingerprint of Claimed Media Entity
920
Is Fingerprint Sufficiently Close To Claimed ?
N
930
Deny Claim of Identity
Y
940
Accept Claim of Identity

Figure 9